Synergy's between fluoride molten salt nuclear reactors and a Lunar ISRU utilizing fluoride molten salts

- The idea here is the molten salt reactor powered by lunar Thorium and Uranium would provide heat to power the molten salt process to smelt Lunar resources as advocated by Landis et al http://www.asi.org/adb/02/13/02/silicon-production.html
- Potently spent fuel from earth powers the initial reactors
- Indeed the molten salt smelter would provide the Fluorine, Thorium, Uranium and salt for the reactor co located next to it! As earths resources deplete we could use this process here on earth.
- This would be a joint DOE NASA project.

Mission design trades

- Would it be feasible for the molten salt reactor to have a direct heat exchanger with the molten salt smelter? (radiation issues)
- Or would it make more since for the molten salt smelter to be heated by electrical power?
- What are the economics of recovering heat from the smelter?(human crew hot water and thermal heat)
- What are the trades between molten reactor/smelter/battery during the lunar night?
- What are the Earth based benefits to a combined molten salt/reactor/smelter?
- Safety(radiation) (battery)might imply that heat goes from reactor to smelter, smelter provides power and heat to crew

- During the 14 day Lunar day solar arrays would power, with the molten salt reactor the molten salt smelter.
- Molten salt also acts as a battery for the solar power
- During the Lunar night the molten salt battery and reactor provide combined power/heat and light to human crew and to the molten salt smelter.
- An analogy would be a molten salt reactor powered aluminum smelter, that recovers heat from the processed metal, something we should be doing on Earth. **
- ** Earth based Aluminum smelter power cogeneration !